Claims

1. Method for the nondestructive measurement of the thickness of thin layers with a probe (11), which has a first coil device (14) on an inner core, the geometrical centre (22) of which coil device and the geometrical centre of at least a second coil device (31) coincide, the at least second coil device (31) partially surrounding the first coil device (24), with an evaluation unit, to which signals of the coil devices (24, 31) are emitted during a measurement for ascertaining the layer thickness, characterized in that a circuit (50) is provided, by which the first and the at least second coil device (24, 31) are excited sequentially during a measurement.

2. Method according to claim 1, characterized in that the coil devices (24, 31) are excited with high frequency.

3. Method according to claim 1 or 2, characterized in that the frequency signals coming from the first and at least second coil device (24, 31), which are emitted at separate times from one another, are limited by the period for the emission of the frequency signals of each coil device (24, 31) by means of transistors (54) which are preferably activated by the circuit (50) in analogy with the coil devices (24, 31).

4. Method according to claim 1, characterized in that the signals emitted by the coil devices (24, 31) are unequivocally assigned to the respective coil device (24, 31) and evaluated independently of one another by a series oscillating circuit (65).

5. Method according to claim 1, characterized in that the coil devices (24, 31) are excited with the same

frequency.

6. Method according to claim 1, characterized in that the first coil device (24) is excited with a frequency between 8 and 20 MHz, and in that the other coil device (31) is excited with a frequency between 4 and 12 MHz.

7. Method according to claim 1, characterized in that the oscillations of the coil devices (24, 31) of the measuring field that is changing during the measurement are interrogated at least twice per second.

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8. Method according to claim 1, characterized in that the first coil device (24) has a circuit (51) and the second coil device (31) has a circuit (52), which are connected parallel to each other, and a flipflop circuit (62, 53) is provided, by which the transistor (54) respectively assigned to the coil devices (24, 31) is advantageously switched time-dependently.

9. Method according to claim 1, characterized in that the frequency signal emitted by the coil device (24, 31) is passed to the evaluation unit via a compensator (58).

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10. Apparatus, in particular for carrying out the method according to one of the preceding claims, with a housing (18), with a first coil device (24) and a second coil device (31) and with a hemispherical placement dome (27), characterized in that a probe head (14) with a ferritic cup-type core (21), which receives the first coil device (24) close to a common geometrical axis (22), is provided and in that the cup-type core (21) has in the common axis (22) a pin (23) which lies within the first coil device (24) and on the end face of

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which the hemispherical placement dome (27), which projects at least partially from the end face of the coil device (14), is provided, and in that a second coil device (31) is provided concentrically outside the cup-type core (21).

11. Apparatus according to claim 10, characterized in that the number of turns of the first coil device (24) is equal to or less than that of the second coil device (31).

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12. Apparatus according to one of claims 10 or 11, characterized in that the first and second coil devices (24, 31) are arranged fixedly in relation to each other and are preferably embedded in a casting composition.

13. Apparatus according to claim 10, characterized in that the first and second coil devices (24, 31) are arranged in one plane with respect to the end face of the probe head (14).

14. Apparatus according to claim 10, characterized in that the cup-type core (21) has at least one lateral slit (28) for the leading through of connection lines.

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15. Apparatus according to claim 10, characterized in that the probe head (14) is mounted such that it can be axially displaced in a guide sleeve (17) and retracted with respect to a protective sleeve (16) arranged fixedly in relation to the guide sleeve (17).

16. Apparatus according to claim 15, characterized in that the protective sleeve (16) has a recess (41), which is preferably prismatically formed, on an end face pointing towards the probe head (14).

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17. Apparatus according to claim 15 or 16, characterized in that the probe head (14) is retractable into the protective sleeve (16) against a spring force, and in that a spring element (37) is arranged with at least slight biasing with respect to the guide sleeve (17).

18. Apparatus according to claim 10, characterized in that the first coil device (24) is designed such that it is sensitive to layer thicknesses and the at least one further coil device (31) is designed such that it is sensitive to curvature.

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19. Circuit for the separate evaluation of two measuring signals, in particular for carrying out the method according to one of claims 1 to 9, characterized in that the detuning of a respective inductance (24, 31) results in a change in frequency, one inductance (24) being influenced primarily by the layer thickness and the other inductance (31) being influenced primarily by the curvature of the object of measurement.

20. Circuit according to claim 19, characterized in that the two inductances (24, 31) have a common earth and the frequency can be coupled out at a switching point (70) in unequivocal assignment to the corresponding frequency signal.

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